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Effect of Pregnancy during TMI Crisis on Mothers' Mental Health and Their Child's Development

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ABSTRACT

Five years after the Three Mile Island nuclear accident, the mental health of women who had been pregnant and living within 10 miles of Three Mile Island at the time of the accident was similar to that of women from the same area who became pregnant after the accident. Ratings of the development of the two groups of children when they were 5 years old were also similar. However, women who were pregnant during the crisis and had been "extremely disturbed" about their pregnancies rated their children's health as poorer than did the women who were pregnant later. (*Am J Public Health* 1991; 81:384–386)

Introduction

A review of published research on the psychological and social effects of the Three Mile Island (TMI) accident showed that women living near the facility who were pregnant or had young children were among those who experienced the greatest psychological distress following the accident.[1] A study conducted by the Pennsylvania Department of Health showed little biological effect of the accident on women who were pregnant during the crisis and on their children.[2]

Five years after the accident, the Pennsylvania Department of Health conducted follow-up studies to assess long-term physical and psychological impacts of the TMI crisis on these same women and children. We report here interviews with the mothers concerning their perceptions of their children's health and development and their own mental health.

Method

The study and control cohorts consisted of 7,433 women who gave birth within 2 years of the TMI accident and lived in communities within 10 miles of the nuclear facility at the time of the births. A 50 percent random sample of each of these cohorts was selected: 1,880 mothers who gave birth within 12 months of the TMI accident; and 1,850 mothers who gave birth from 13 to 24 months after the accident. The latter group served as controls. Mothers who had moved out of the area since their children's births, as well as mothers who still lived in the vicinity of TMI, were interviewed. A 97 percent response rate was achieved for each sample,

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TABLE 1—Multiple Regression Analyses Comparing Ratings of Mothers' and Children's Health by Mothers in the Study and Control Groups (N = 2,585)

Dependent Variables	Regression Coefficients for Study-Control Comparisons[a]	Standard Error
Ratings of child's health (high score = poor health)	.0438	.0185
Number of child's visits to physician in past year	.0536	.0317
Developmental profile (high score = poor development)	.0310	.0685
Preschool behavior scale (high score = emotional problems)	.0241	.0211
Ratings of mother's health (high score = poor health)	−.0000	.0174
Mother's depression score	.0151	.0095
Mother's anxiety score	.0147	.0088

Notes: Covariants are listed in text. N varies slightly with number of missing values for each dependent variable. [a]Control group = 0, study group = 1.

TABLE 2—Analyses of Covariance of Mothers' Mean Ratings of Their Children's Overall Health by Timing of Pregnancy and Disturbance about Pregnancy

Disturbance about Pregnancy	Pregnant During Crisis	Pregnant After Crisis	P value of Difference
Extremely disturbed	2.17 (N = 327)	1.95 (N = 87)	.0236
Somewhat disturbed	1.88 (N = 667)	1.94 (N = 478)	.3358
Not disturbed	1.69 (N = 388)	1.71 (N = 638)	.7284

Note: Health was rated 1, excellent; 2, very good; 3, good; 4, fair; or 5, poor. Covariants are listed in text.

yielding 1,833 pairs of mothers and children in the study sample and 1,808 pairs in the control sample.

The analyses reported here involved women who were pregnant at the time of the accident, i.e., those who gave birth during the 9 months after the accident (study group), and those who gave birth during the corresponding 9 months a year later (control group). The study group was interviewed in 1985 when the index children were 5 years old, and the members of control group were interviewed in 1986 when their children were also 5 years old.

The dependent variables analyzed were the number of physician visits,[3] the developmental profile for 5-year-old children,[4] the preschool behavior scores suggestive of emotional problems,[5,6] the mothers' anxiety and depression scores,[7,8] and the mothers' overall ratings of their children's and their own health.

Results

We fitted multiple regression models with terms for study versus control group, month of child's birth, child's sex, child's birth order, mother's marital status, time mother spends caring for child, mother's education, mother's employment status, mother's race, mother's age, household size, and distance of home from TMI at the time of the crisis. Dependent variables were log transformed to adjust for skewness.

Table 1 shows that all but one coefficient (mother's health) are in the direction suggesting poorer status for the study group. Only one coefficient, however, mothers' overall ratings of their children's health was statistically significant. Women who gave birth within 9 months of the accident gave their children's health poorer mean ratings than women who gave birth in the same months a year later.

Examination of the distribution of these general health ratings showed that the difference in the two groups was largely in the percentage of mothers who rated their children's health as "excellent"; that percentage was 7 percent lower among the study mothers than among controls. We also examined interactions among the study and control groups' ratings and mothers' age, birth order of the child, and mothers' education while controlling for the same 11 covariants. No interactions were statistically significant.

Mothers were grouped based on how disturbed they said they had been about their pregnancies when they were interviewed 5 years earlier, shortly after their children's births (Table 2). The poorer health ratings were primarily among mothers who had been "extremely disturbed" about their pregnancies. The statistic for this interaction effect had a probability of .0635. The difference between the two groups was significant only for the "extremely disturbed" group.

Discussion

The interview data reported here are primarily subjective and indicate how the experience of being pregnant during the TMI crisis affected the mothers' views of their children and themselves. Although the findings showed a poorer status for women who were pregnant during the crisis, the differences between this group and the controls were small. The only notable difference was in the smaller proportion of study group mothers who rated their children's health as "excellent." Small but statistically insignificant differences between women who were pregnant during the crisis and women who became pregnant afterward were found for long-term anxiety, long-term depression, ratings of the children's development, and reports of children's physician visits.

Women who were pregnant during the crisis and who were also "extremely disturbed" about their pregnancies tended to rate their children as less healthy. This pattern is similar to that reported by Roht, *et al*, who found that people living near toxic waste sites were more likely to report health problems if they believed that the sites could affect their health.[9] Roht, *et al*, interpreted their findings as an example of response bias induced by the expectations of the respondents.

The present findings can be interpreted similarly: that is, the mothers of children born within 9 months of the TMI accident, who were "extremely disturbed" because of possible long-term effects of radiation released during the accident, may have paid special attention to their children's health problems, resulting in the general impression that their children were less healthy. Whether these children were less healthy than controls will be investigated further in a medical record review study now in progress. □

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Using a State Cancer Registry to Increase Screening Behaviors of Sisters and Daughters of Breast Cancer Patients

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ABSTRACT

The Pennsylvania Cancer Registry was used to contact breast cancer patients and, through them, their adult sisters and daughters. The sisters and daughters were counseled concerning their higher than average risks for breast cancer and their need for mammography and breast self-examination. Results showed a 9 percent increase in mammography and a 10 percent increase in breast self-examination rates for the counseled over control group. Costs were $49 per counseled sister or daughter indicating a need to increase cost effectiveness before implementation is practical. (*Am J Public Health* 1990; 81:386–388)

Introduction

Cancer registries have contributed to the treatment and prevention of cancer by making it possible to study the distribution of the disease, its causes, and the planning of services.[1,2] Women whose mothers or sisters have had breast cancer have two to three times the usual risk for developing breast cancer in their lifetimes.[3] We used the registry to contact breast cancer patients and through them first degree female relatives in order to counsel them about what to do to ensure early diagnosis and treatment of breast cancer, should it be found.

Methods

Potential participants were sisters and daughters of breast cancer patients diagnosed between June 1982 and June 1984 and living in eight counties in central Pennsylvania. Names of all breast cancer patients from four counties were obtained from the Pennsylvania Cancer Registry at the beginning of the study and randomly assigned to three groups where sisters and daughters were to be counseled in years 1, 2 and 3, respectively, of the project. At the end of the first year, four additional counties were added to the study and randomly assigned to the years 2 and 3 groups. At the end of 21 months, the knowledge, attitudes and behavior of sisters and daughters of breast cancer patients in all three groups were assessed using telephone interviews. Those who had received counseling in the first 21 months were "experimental," while those yet to be counseled were controls. This design controlled for the effects of media attention and public education programs that occurred during the first 21 months of the study.

Permission to contact the patients was obtained from the physicians listed on the cancer registry forms. When permis-

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